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ASSESSMENT OF HOUSEHOLDS' PERCEPTION TOWARDS PARTICIPATORY FOREST MANAGEMENT THE CASE OF HEBAN ARSI WOREDA, ETHIOPIA

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Abstract:

Understanding the perceptions of local communities towards participatory forest management (PFM) is essential for successful improvements of PFM regarding forest conservation and livelihood improvement. However, there needs to be more research evidence on the perception of local communities for PFM intervention. To better understand the local communities' perception of PFM, 131 households were surveyed. Data were collected through the household survey, key informant interviews (KIIs), focus group discussion (FGD) and analyzed using descriptive statistics. Results show that the households perceived that there is no deforestation due to the intervention of PFM, which leads increment of species diversity, increased forest coverage, increased productivity of the forest, and increased valuable species. Respondents also perceived that the PFM has opportunities to change a negative attitude to a positive attitude through giving power to the local community, enabling bounded members, bringing the right to exclude non-PFM members, creating a sense of belongingness, and encouraging the right to use the forest products. The finding demonstrated that forest income was the second contributor of household income among income sources. Actions such as better protection of existing forests to avoid overuse, access to alternative livelihood diversification, better access to market, access to better skills and knowledge on the collection and use of forest products and reforestation were suggested to increase the existing benefits and management of PFM. The study's finding suggests further improvement of local communities' perceptions and attitudes and providing alternatives to improve forest conditions and livelihood.

Keywords: Community, Forest Conservation, Forest Degradation, Participatory Forest Management, Perception

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INTRODUCTION

The forest is crucial for different ecological, economic, and socio-cultural benefits. Forest contributes to the protection of biodiversity, mitigating climate change, provisions fresh water, reduces soil erosion and improves soil fertility, and maintains the hydrological cycle (Tesfaye, 2017). Worldwide rural communities mainly depend on forests for their livelihoods, cash resources, and safety nests during times of shortage. Similarly, forests are essential components of livelihood for rural communities of Ethiopia (Wondie & Tamesgen, 2013). Many communities in Rural Ethiopia depend on the forest to meet their needs, such as energy, livelihood diversification, construction material, and farm tools (Amare et al., 2016). However, forest resources are shown a declining trend worldwide due to different factors such as commercial logging, conversion of forest land to cropland, lack of community participation, and so on (Tadesse & Teketay, 2017).

In the same way, the status of forest resources has been continuously declining from time to time regarding changes in the forest land size and quality, such as species composition and structure. This is because forest resources in Ethiopia are managed through government control and without consultation and participation of local communities who lived inside and around the forest resource in the past years (Tadesse & Teketay, 2017; Tesfaye, 2017). The centralized forest management system dismisses local communities' capacity to manage and use forest resources sustainably. Centralized control restricts regulations that prohibit the use of forest resources (Tadesse & Teketay, 2017; Tesfaye, 2017). One of the negative outcomes of the centralized forest management approach is the loss of local control of forests and ignoring local institutions, indigenous knowledge, and use rights of the local communities over the forest resources (Tesfaye, 2017; Walle & Nayak, 2021). However, local communities have ample knowledge and respect for the forest and other natural resources. As a result of rapid economic, population growth, lack of benefit-sharing mechanisms, and lack of public awareness among the local people contribute to losses of forest resources in Ethiopia (Tesfaye et al., 2012; Ameha et al., 2014; Tadesse and Teketay et al., 2017; Tesfaye, 2017).

To respond to and minimize the problem of forest sustainability, different actors such as the government, non-governmental organizations (NGOs and development actors have introduced the PFM approach in different parts of Ethiopia since the 1990s (Winberg, 2010; Tegegn, 2022). The concept of PFM is a strategy to achieve sustainable forest management by incorporating local communities' benefits and perceptions (Tadesse & Teketay, 2017; Duguma et al., 2018; Tegen, 2022). This approach allows the local community living in and around the forest resources to conserve and protect the resources and link them with their economic needs (Tegegn, 2022). Recently, PFM has been an accepted way of sustainable forest management and provides a dual purpose to improve the forest conservation and livelihoods of the local communities (Tesfaye, 2017). In addition to PFM, different community-centered forest management approaches, such as community forestry and joint forest management (JFM), have been implemented in many developing countries, including Ethiopia (Nath, 2009; Islam, 2016). These terms often refer to a range of arrangements covering different degrees of power-sharing between the state and communities (user groups) in the decision-making processes about forest resources and their management (Okumu, 2017). The overall goal of such shifts in forest resources management is to ensure sustainability through increasing community participation in forest management, improving the welfare of locals, and addressing market, institutional and policy failure associated with ill-defined property rights, externalities, and market imperfections (Okumu, 2017).

The success of PFM conservation depends on the perception and attitudes of local communities through their participation (Tesfaye et al., 2012; Ameha et al., 2014; Siraj et al., 2016; Tesfaye, 2017). Previous evidence demonstrated that the benefits and values of forest resources were affected by the conservation attitudes and perceptions of local communities (Ameha et al., 2014; Siraj et al., 2016). Therefore, it is expected to bring positive attitudinal changes to local communities regarding forest management. The integration of local communities understanding and perception of forest conservation and management is an essential component for the effectiveness of forest management and livelihood improvement from PFM in a sustainable manner. More importantly, consideration of local communities' attitudes and beliefs are an important element of PFM sustainability (Tadesse & Teketay, 2017). These perceptions and attitudes may be positive or negative toward forest-related activities (Tesfaye et al., 2012). The negative or positive perceptions of local communities for PFM maybe affect their participation in forest management (Ameha et al., 2014; Siraj et al., 2016). However, in many ways, communities'



perceptions of PFM efforts are rarely studied regarding different PFM activities such as the decision-making process, conservation, benefit sharing, planning, etc. (Tesfaye, 2017).

Therefore, understanding how the perception of the community affects the conservation and management and utilization of forest resources through PFM is important in a country where many local communities depend on forest resources for their livelihood. Previous scholars demonstrated that the perception and attitudes of local communities toward PFM were affected by different demographic and socio-economic variables (Tesfaye et al., 2012; Ameha et al., 2014; Tadesse & Kotler, 2016; Tesfaye, 2017). However, community perception regarding the contribution and management of PFM is less researched. Accordingly, assessing and understanding community perception towards PFM is essential for the sustainability of PFM. Until, studies regarding community perception towards PFM are lacking in the country in general, in Heban Arsi woreda in particular. This study therefore conducted in Heban Arsi woreda, Ethiopia, to access the perception of local communities towards the existing status and future sustainability of PFM.

METHODS

The study was conducted in Heban Arsi district) which is located in the eastern part of Lake Langano, and the district town (Goljota) is 226 km from Addis Ababa along the Southeastern part of the country. The geographical location of the district ranges from 7o 9' N to 7o42'N latitude and 38o25' E - 38o54' E longitude. The altitude of the district ranges from 1500 to 3000 m above sea level (Hadada, 2020). The total area of the district is about 35,613.6 hectares.

The topographic feature of Heban Arsi Woreda is mostly a flat and undulating landscape. The district exhibits three agroecological zones: highland, midland, and lowland. These agroecological zones differ in altitude and in rainfall distribution. The rainfall distribution is bimodal, with the short rainy season occurring from March to May, while the long rainy season is from July to October. The annual average rainfall of the study area is 825mm (ranges from 500 to 1150 mm), and the mean annual temperature is 19oc (ranges from 10oc to 27oc) (Hadado, 2016). The dominant soil type of the district is largely derived from volcanic activities in the Rift Valley. The soils of the study area are characterized as Mollic Andosols (Lemenih, 2004). The drainage systems of the district are Gudemso, Guracho, Delate and Lepis also pass through the district. Lake Langno is also found in the district (Hadado, 2020).

The physical conditions and variations in altitudes have resulted in a great diversity of climate, soil, and vegetation which in turn caused the evolution of different plant species with a large diversity. Before 20 years ago, the district was substantially covered with natural forests (Hadado, 2016). Today, the district is covered by 19.19% forest area out of the total land area, including natural forest, community forest, and private forest (Hadado, 2020).

Heban Arsi District has a total of 75831 people who are settled and organized under the district. From those, 41103 of them are male and 34728 females (CSA, 2007). The population density of Heban Arsi District is about 213 persons per square kilometer (CSA, 2007). The major agricultural activities in the district are crop production and livestock rearing in the form of a mixed farming system. Maize, wheat and barley are the most widely grown cereal crops in the district (Hadado, 2020).

To achieve the study's overall goal, a multistage stage random sampling technique was employed to select sample kebeles and households. In the first stage, the study district was identified based on the potential of PFM. After that, the three PFM kebeles of the woreda were selected based on their potential. The selected kebeles share similar socio-economic activities, agroecological characteristics and biophysical settings based on information getting from

consulting of Heban Arsi agricultural office. Then, sample households were selected from selected kebeles using a simple random sampling technique with a random number method. The lists of households were obtained from the kebele administration and district office of PFM-intervention areas. Finally, the sample sizes of households were determined from the total households representing a sampling intensity of 20%, as recommended by Kumar (1999). Based on this, a total of 131 household heads were randomly selected (Table 1).

Table 1. Number Of Respondents Selected from Sample Kebeles in The Woreda

Sample Kebeles	Total Households	Sample Households	% of Sample Households
Degaga	270	54	41.3
Sambaro Rogicha	280	56	42.7
Shopa	104	21	16.0
Total	654	131	100

In this study, both qualitative and quantitative data were used. Data were collected from primary and secondary sources. The primary data were collected from the semi-structured household survey, personal observations, focus group discussions (FGDs), and key informant interviews (KIIs). These primary data were supplemented by data from secondary sources collected from different published and unpublished sources. Data collection tools were developed through reconnaissance surveys and literature reviews for constructing relevant characteristics of local communities' perceptions. After that, quantitative data were collected using a household survey with a semi-structured questionnaire. For qualitative data collection, both FGD and KIIs were performed. The number of participants in each FGD was purposively selected in discussion with experts, the kebele administration chairperson, and development agents. Participants were selected from different age groups, genders, and social statuses. FGD was held separately with men and women and with groups of different well-being ranks. Two FGDs were conducted per kebele, and the discussions were held with aiming of documenting local knowledge regarding PFM practices and livelihood activities as a result of the PFM approach. Similarly, KIIs were selected from different individuals at different levels. Accordingly, community elders, chairpersons, development agents, forestry experts, and officials have participated. Apart from these, personal observation was also made in the selected study area with local community elders, development agents, and other experts who are familiar with and knowledgeable about the area.

The collected data were analyzed using quantitative and qualitative data analysis approaches. Before data analysis, data entry, data editing, and management were performed. The quantitative data were analyzed using SPSS version 26. Descriptive statistics such as percentages, mean, standard error, and frequency were used to summarize the data. The qualitative data collected through KII, FGD, and transect walk observation was summarized qualitatively.

RESULT AND DISCUSSION

In the study area, the majority (77.9%) of respondents were male, and 22.1% were female. Regarding the marital status of sample households, 80.9% of them were married and followed by a single (13%), divorced (3.8%), and widowed (2.3%). The educational status also showed that majorities (72.7%) of respondents were educated, and the remaining 27.3% were illiterate. The result shows that about 84.7% have access to training on different livelihood improvement activities. Regarding credit access, about 84% of PFM groups had access.

Table 2. Summary of categorical socio-economic characteristics of respondents

Variables	Category	Frequency	Percent
Sex	Female	29	22.1
	Male	102	77.9%
Marital status	Single	17	13
	Married	106	80.9
	Divorced	5	3.8
	Widowed	3	2.3
Education level	Illiterate	26	27.3
	Literate	105	72.7
Access training	No	20	15.3
	Yes	111	84.7
Access to credit	No	21	16
	Yes	110	84

Table 3 presents the continuous socio-economic variables of sample respondents are presented. The average age of the study respondents was 44 years, and the average family size of the sample households was 6.9 persons per household. Regarding the dependency ratio, households had 3.8 persons per household. Regarding household resources, the mean land holding and mean livestock holding in tropical livestock units (TLU) were 3.3 ha and 7.9, respectively. The average walking distances (measured in minutes) to the market and forest from the residence of the study households were 94.4 and 67.3 minutes, respectively.

Table 3. Summary of continuous socio-economic characteristics of respondents

Variables	Mean	Std. Error
Age	44.0	1.0
Family size	6.9	0.3
Dependency ratio	3.8	0.2
Total land holding	3.3	0.3
Livestock holding (TLU)	7.9	0.6
Distance to market (minutes)	96.4	5.1
Distance to forest (minutes)	67.3	4.1

The majority of respondents (55.7%) perceived that there is no deforestation due to the intervention of PFM. About 44.3% of respondents also indicated that there is some deforestation due to some shortcomings of existing PFM access. Only 3.1% of respondents perceived that deforestation is going on (Table 4).

Table 4. Community perception on the status of deforestation after PFM intervention

Status Deforestation	Frequency	Percent
Deforestation going on	4	3.1
There is some deforestation	58	44.3
There is no deforestation at all	73	55.7

The indicators of forest improvement were assessed in PFM areas following the implementation of the program (Table 5). The finding from the household survey revealed that

about 25.4% of respondents reported that there is an increment in species diversity followed by increasing in forest coverage (22.9%), increased productivity of the forest (20.8%), address environmental degradation (17.5%) and increased the number of valuable species (13.4%) due to introduction of PFM. During FGD, participants stated that PFM encouraged all of its participants to plant trees in degraded environments by collecting naturally grown seedlings from the natural forest. Similar works were also reported on the significant contribution of PFM to the forest and other environmental resource degradation (Tadesse & Teketay, 2017; Kedir et al., 2018; Mawa et al., 2021). Defere (2022) demonstrated that the PFM system is more useful for forest sustenance compared to state-controlled forests.

Table 5. Improvements of forest components after PFM intervention

Indicators of forest improvements after PFM Program	Frequency	Percent
Increase of forest area	30	22.9
Species diversity	31	25.4
Increase number of valuable species	11	13.4
Address environmental degradation	22	17.5
Forest productivity	37	20.8

The PFM program has many opportunities awarded to local communities to change their negative attitude to positive ones following the program (Table 6). The result showed that the introduction of the PFM program gives power to the local community and accounts for 26.8%. Similarly, the PFM program enables bounded members by forest block association (21.4%), brings the right to exclude non-PFM members (19.8%), creates a sense of belongingness (16.3%), encourages the right to use the forest products (8.5%) and means of reduced deforestation (7.4%). In line with this finding, community-based forest management (CBFM) gives access to rights, responsibility, empowerment, and ownership opportunity to local communities for sustainable management of forests (Tadesse & Teketay, 2017).

Table 6. Community perception on opportunities of PFM for conserving the degraded environment

Indicators	Frequency	Percent
It gives power to the community	35	26.8
Enables to develop options for reducing deforestation	10	7.4
It creates feeling a sense of belongingness	22	16.3
Encourage the right to use the forest products	11	8.5
Due to exclusive use right	26	19.8
Due to bounded members by forest block association	28	21.4

FGD and KIIs response: Implementing PFM based on the agreement, the implementation of the forest management plan with its different activities was started by stakeholders. The government agency supported PAs as well as FUGs technically and materially whenever necessary. The management plan, as well as the agreement, can be revised when the stakeholders agree with it after monitoring and evaluation. The majority of the respondents indicated that the reason for the establishment of PFM at the site was the need to reduce the ever-increasing deforestation. Even to minimize conflicts among the community and the stakeholders by realizing the need to involve communities in conservation and the hindsight of experience, it has become clear that an alternative approach is necessary. These changes represented a change of emphasis

within forest conservation from a fences and fines approach to one in which more holistic strategies or approaches were adopted. A comprehensive PFM program has been established and is advocated as a solution to the past shortcoming in forest management.

Most of the FGD participants explained that before PFM, the level of deforestation was severe, but now associations are protecting their respective plantations and planting sites where the concessions area is open. They agreed that the plantation has increased in volume and total land coverage compared to the time before PFM. Moreover, they indicated that PFM was one of the tools that reduced deforestation and improved the management of the plantation. According to the district office, the conventional way of managing the forest could not protect the plantation. Because of this, the participation of the local community became decisive in conserving this plantation. After PFM, the forest user members started to understand their rights and obligations. As a result, the user groups were protecting and planting most parts of the open area as per the management plan. As a result of this, the plantation is improved.

The perception of the local community on the contribution of PFM to prevent a degraded environment was assessed using the Likert scale (Figure 1). About 51.9% and 23% of respondents in the PFM and non-PFM, respectively, agreed on the importance of PFM intervention for forest improvement and environmental conservation, while 34.4% from PFM and 24% from non-PFM agreed on the contribution of the approach to forest degradation and environmental degradation. Thus, most sample households argued for the contribution of PFM intervention as a means of forest management in their locality (Figure 1).

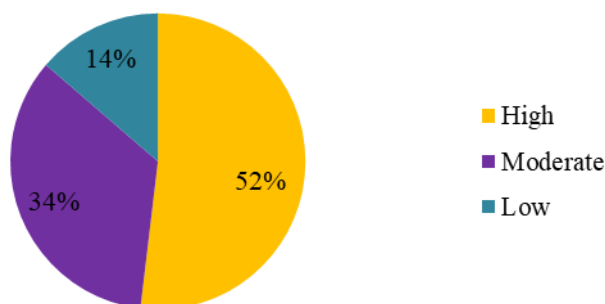


Figure 1. Community Perception of the Role of PFM on environmental conservation

In addition to household survey results, FGD and KII participants selected at different kebeles confirmed via interview that PFM contributed to forest regeneration and conservation at their locality. They indicated that the program was initiated with the community living inside and around the forest to manage and use their forest resource sustainably. Furthermore, the FGD and KIIs participants argued that encroachments for agriculture and settlements, the expansion of grazing land, and extraction of forest products under the FUG slightly decreased currently compared to the initial establishment due to an increase of new members engaged in PFM. Similarly to this finding, Kedir et al. (2018) reported that PFM is an important program to contribute to the improvement of forest conservation. In addition to this, the PFM program can create environmental awareness to rehabilitate the degraded forest area (Tadesse & Assefa, 2019).

Households in the study area depended on four major income sources. Those income sources are crop income, livestock income, non-farm income, and forest-related income (Table 7). Crop income was the major household income source, followed by forest, livestock, and non-farm income. Crop income accounts for about 50% of the total household income. Forest income was the

second most important source of income, accounting for 20.7% of the total household income. Livestock and non-farm income are also important income sources which account for 19.6% and 9.7 %, respectively. The result is in line with observation, Mawa et al. (2021) reported that forest income was the second most important income source for forest-adjacent communities that are members and non-members of community-based forest management. In addition, PFM is important to improve local communities' livelihoods by providing forest-friendly alternative income sources (Tegegn, 2022). From an income perspective, PFM helps to diversify income sources, increase household income levels and build household assets in forest-dependent communities (Defere, 2022). Income and poverty levels affect local communities toward forest conservation (Nzau et al., 2022).

Table 7. Average annual income from major income sources (Birr)

Income source (000 Birr)	mean± SE (Standard Error)	Share (%)
Crop income	25.55±3.70	50.0
Livestock income	10.02±1.53	19.6
Non-farm income	4.98±0.45	9.7
Forest income	10.57±0.99	20.7

The study showed that most respondents (55.7%) perceived that forest products are moderately important to households (Table 8). Importantly, the percentage of people who thought that the level of forest product estimated at 32.8% stated as very important. The remaining 10.7% of respondents perceived that the level of forest product importance was less important. The FGD and KII participants also point out that the levels of forest products from PFM contribute moderately to local communities during a time of income shortage. The finding agreed with previous studies that demonstrated that the majority of PFM participant communities perceived forest products were very important to the household economy, and fewer respondents claimed that the forest did not have any importance regardless of protection (Tesfaye, 2017; Tadesse & Teketay, 2017).

Table 8. Community Perception on the Level of forest product importance

Indicators	Frequency	Percent
Very important	43	32.8
Moderately important	73	55.7
Less important	14	10.7
Not important	1	0.8

The level of local community dependency on forest products is presented in Figure 2. The result showed that the majority (48.1%) of respondents stated that they were fully dependent on their livelihoods. On the other hand, about 30.5% of respondents revealed that there were partially dependent on forest products. The remaining 16% and 5.3% of respondents responded that they were not much dependent and less dependent. Defere (2022) demonstrated that forest-adjacent communities are highly dependent on forest products to meet their household needs, especially during times of income shortage. This indicates that forest products are a means of a safety net during times of drought and the lack of other alternatives.

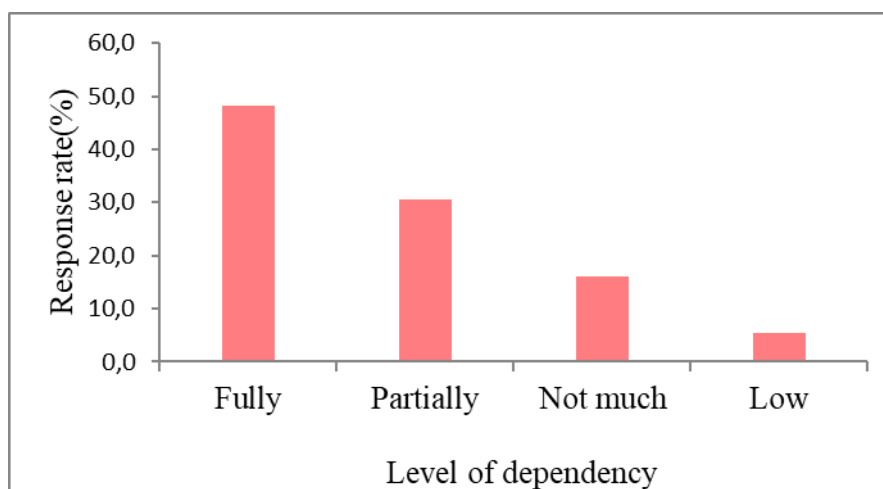


Figure 2. Level of local community dependency on forest products

The different actions were suggested to increase the existing benefits from the forest presented in Table 9. The result showed that about 39% of sample respondents stated that better protection of existing forests to avoid overuse is one of the actions used to sustainably generate benefits from the forest. The result also indicated that 33.9% of respondents revealed access to alternative livelihood diversification to reduce dependency on forests, followed by better access to the market (12.9%), access to better skills and knowledge on the collection and use of forest products (7.3%) and reforestation (6.9%). Pieces of evidence showed that a high percentage of the local community's positive attitude toward conservation indicates forest conservation success (Islam et al., 2016; Tesfaye, 2017). Another study also demonstrated that the implementation of locally specific conservation actions needs to be developed and applied to keeping the sustainability of PFM (Nzau et al., 2022).

Table 9. Actions needed to increase benefits from the forest

Actions	Frequency	Percent
Better protection of forests to avoid overuse	85	39.0
Better skills and knowledge on how to collect and use products	16	7.3
Livelihood diversification to reduce dependency on forest	64	33.9
Better access to market	28	12.9
Reforestation	15	6.9

CONCLUSION

The findings of the study provide information about the perception of local communities on the existing PFM regarding its contribution and management system. Results showed that the households perceived that PFM intervention provides an increment in species diversity, increases forest coverage, increases forest productivity, addresses environmental degradation, and increases the number of valuable species. Respondents also perceived that the PFM program has opportunities to change a negative attitude to a positive one by providing power to the local community, enabling bounded members, bringing the right to exclude non-PFM members, creating a sense of belongingness, encouraging the right to use the forest products and means of reduced deforestation. The finding demonstrated that the share of forest income is second among household income sources. Respondents also suggested different actions such as better protection



of existing forests to avoid overuse, access to alternative livelihood diversification, better access to the market, and access to better skills and knowledge on the collection and use of forest products and reforestation were suggested to increase the existing benefits and management of PFM. To cope with the demand of the increasing population from time to time, diversified alternative income sources should be designed to improve asset accumulation and reduce their over-dependency on the forest. Such interventions are taken, which might reduce the pressure of over-exploitation of forest resources from the rapidly increasing population adjacent to forest areas. Even if the current PFM establishment provides viable livelihood benefits to PFM communities, more designs and options are needed to sustainably meet local communities' expected and growing demand. So, to ensure sustainable livelihood and forest management, alternative income-generating activities and efforts are needed, such as improving the quantity and quality of the current initiated modern beehives and fattening activities and ecotourism activities, enabling a reduction of the dependency of local communities on direct forest product collection.

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